FUJIFILM

DICOM Conformance Statement
FUJI Computed Radiography
QA-WS771
(STANDARD)

June 2001
3rd Edition

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004-310-30 2001.06

Revision History

History	DATE	Revision
Revision 1.0	1998.12.13	New release
Revision 2.0	2000.02.08	Revision for A03 version software Errors corrected for the A03 version.
Revision 2.1	2000.06.13	DRC, TAS, MFP and PEM processing parameters renewed from old names to new names. VOILUT deleted as it is not supported.
Revision 2.2	2001.03.12	Private information added. - Mammography film format information added. - Energy subtraction processing result information added. MWM-related information added. Image Type setup value changed. VOILUT module added. Patient study module added.

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1. Overview

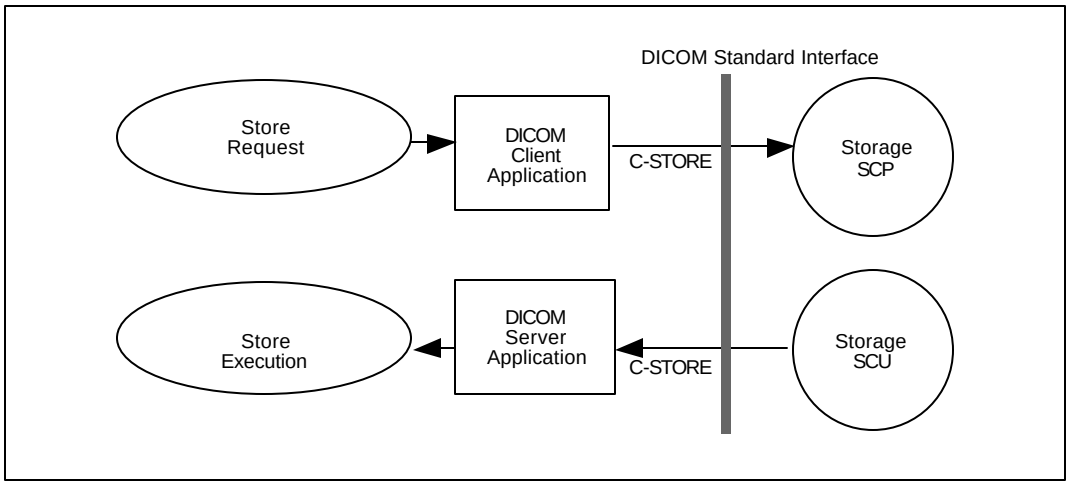
This conformance statement was written in accordance with PS3.2 of DICOM V3.0.
The applications described in this conformance statement are for the implementation of FUJI Computed Radiography QA-WS771, which implements conversion between DICOM networks and FUJI Computed Radiography. The QA-WS771 functions as a service class user/provider (SCU/SCP) for the storage service class.

2. Model Implementation

The QA-WS771 implements two DICOM application entities for establishing applications with remote application entities.

2.1 Application Data Flow

The DICOM Client Application and DICOM Server Application are Windows applications for providing communication between FUJI products and DICOM network devices.
Application data flow is shown below.



2.1.1 DICOM Client Application

The DICOM Client Application establishes on the remote DICOM AE associations for the DICOM storage service class. For each internally registered transmission queue unit, a new association is started up for the remote DICOM AE. Through the associations established, a single image or multiple images can be transmitted. The application converts an image loaded on the transmission queue from the internal management data format to the DICOM format and transmits it to the remote DICOM AE via the established associations.

2.1.2 DICOM Server Application

The DICOM Server Application monitors the association requests from the remote DICOM AE and handles the association negotiations for the DICOM storage service. When an association has been established, storage requests are received from the remote DICOM AE, and DICOM information objects received are converted to the internal storage format. The converted information is stored in non-volatile media and registered in the database. If storage/registration results in normal termination, a normal response will be sent to the remote DICOM AE. If fails, a failure response will be sent to the remote DICOM AE.

2.2 AE Function Definition

2.2.1 DICOM Client Application

The DICOM Client Application supports the following DICOM service class SCU function:

- Storage

2.2.2 DICOM Server Application

The DICOM Client Application supports the following DICOM service class SCP function:

- Storage

2.3 Establishing Orders for Real World Activities

Does not apply.

3. Application Specifications

3.1 AE Specifications

■ **DICOM Client Application**

The DICOM Client Application entities as the SCU provide the following DICOM SOP classes with the standard conformance.

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1

■ **DICOM Server Application**

The DICOM Client Application entities as the SCP provide the following DICOM SOP clas ses with the standard conformance.

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Verification	1.2.840.10008.1.1

3.1.1 Policy for Establishing Associations

3.1.1.1 Overview

Associations are established when the following conditions are satisfied.

- The number for the application context name consists of as follows.

Application Context Name	1.2.840.10008.3.1.1.1

- Maximum PDU size is included at time of association negotiation.
  The maximum PDU size for the QA-WS771 is as follows.

Maximum Length Protocol Data Unit	128KByte

- The called AE title is the own AE title (the value set for the configuration file).
- The AE title, port no. (needed only for the DICOM Client Application) and IP address for the remote DICOM AE are known (values set for the configuration file).

3.1.1.2 Number of Associations

As the storage service SCU, the DICOM Client Application attempts a maximum of four associations at the same time to the remote DICOM AE. The maximum number of associations can be changed as specified internally.
The DICOM Server Application can accept a maximum of four associations at the same time for the storage service SCP. The maximum number of associations can be changed as specified internally.

3.1.1.3 Asynchronous Operations

Not supported.

3.1.1.4 Implementation Identification Information

The DICOM Image Sending/Server Applications are provided with the following implementation class UID.

QA-WS771 Implementation Class UID	1.2.392.200036.9125.5457.1.15.1

The implementation version name provides the following values.

QA-WS771 Implementation Version Name	QAWS77101A05

3.1.2 Association Startup Policy

To conduct the following service, the DICOM Client Application attempts to start up new associations on the remote DICOM AE.

- Storage

3.1.2.1 Related Real World Activities

A related real world activity is to attempt transmission of image objects.

3.1.2.2 Proposed Presentation Context

The DICOM Client Application proposes any of the presentation contexts indicated below.
Proposed Presentation Contexts can be set individually for each remote DICOM AE. The DICOM Client Application proposes a maximum of three pieces of Transfer Syntax for each Abstract Syntax.

Presentation Context Table				
Abstract Syntax		Transfer Syntax	role	Extended Negotiation
Name	UID			
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	See the following table.	SCU	None

Transfer Syntax	
Name	UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Jpeg Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]): Default Transfer syntax for Lossless JPEG Image Compression	1.2.840.10008.1.2.4.70

3.1.3 Association Accepting Policy

The DICOM Server Application negotiates for associations for a request that comes from the remote DICOM AE for establishing associations to perform the following services.

- Storage

3.1.3.1 Related Real World Activities

A related real world activity is to attempt acceptance of image objects from the remote DICOM AE.

3.1.3.2 Acceptable Contexts Possible to Receive

The following presentation contexts can be accepted.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		role	Extended Negotiation
Name	UID				
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	See the following table.		SCP	None
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Transfer Syntax	
Name	UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Jpeg Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]): Default Transfer syntax for Lossless JPEG Image Compression	1.2.840.10008.1.2.4.70

3.1.3.3 Transmission Syntax Selection Policy

Proposed Transfer Syntax in the Presentation Context can be specified for each remote AE. A maximum of three pieces of Transfer Syntax can be specified according to the following priority for selection.

JPEG Lossless Explicit VR Little Endian Implicit VR Little Endian

4. Communication Specifications

4.1 Communication Stacks Supported

This system provides DICOM V3.0 TCP/IP network support.

4.2 TCP/IP Stacks

This system utilizes the TCP/IP stacks provided by the WINDOWS-NT4.0 OS.

4.3 Physical Media Supported

IEEE 802.3 (10BASE-T)/ IEEE 802.3U (100BASE-TX)

5. Expansion Specifications

Not applicable.

6. Configuration Information

The QA-WS771 has applications specifically for configuration setting. The following information can be set for its own equipment and connected devices.

- IP address
- Host name
- AE name
- Port no.

A maximum of 127 devices can be connected.

7. Expanded Character Set Supported

The following character sets are supported.

- ISO-IR 6 (default) Basic G0 Set
- ISO-IR 100 Latin Alphabet No. 1
- ISO-IR 13/14 Half-size katakana/Alphabet

- ISO-IR 87 (*1) JIS X 0208 Japanese 2-byte codes

8. Information Object Definitions (IOD)

This section indicates the IOD that the QA-WS771 handles.

8.1 Module Table

Because the QA-WS771 assumes responsibility for expansion of the CR image storage SOP class, the necessary IOD is presented in the table below.

8.1.1 CR Image IOD Module Table

Following is a list of the modules used for the CR image storage SOP class.

Information Entity	Module	Usage Method	Reference
Patient	Patient	M	8.2.1.1
Study	General study	M	8.2.2.1
	Patient study	U	8.2.2.2
Series	General series	M	8.2.3.1
	CR series	M	8.2.6.1
Equipment	General equipment	M	8.2.4.1
Image	General image	M	8.2.5.1
	Image pixels	M	8.2.5.2
	Contrast medium/Bolus	C	8.2.5.3
	CR image	M	8.2.6.2
	Overlay	U	8.2.7.1
	Curve	U	Not supported
	Modality LUT VOI LUT	U U	8.2.8.1 8.2.8.2
	Common SOP	M	8.2.9.1
	Private CR information	U	8.2.10.1

8.2 Information Module Definitions

Tags not specifically mentioned at NOTE are handled the same as DICOM definitions.

8.2.1 Patient IE Module

8.2.1.1 Patient Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Patient's Name	(0010,0010)	2	Patient's name	Multi-byte base
Patient ID	(0010,0020)	2	Main hospital ID no. or code for patient	
Patient's Birth Date	(0010,0030)	2	Patient's date of birth	
Patient's Sex	(0010,0040)	2	Patient's sex. Enumerated values: M = Male F = Female O = Other	If not set, Length = 0.
Other Patient IDs	(0010,1000)	3	Other name used for patient's identification	

Ethnic Group	(0010,2160)	3	Patient's race	
Patient Comment	(0010,4000)	3	Additional user-defined information on the patient	

8.2.2 Study IE Module

8.2.2.1 General Study Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Study Instance UID	(0020,000D)	1	Identifier unique to study	
Study Date	(0008,0020)	2	Date study began.	Date compilation of study information began
Study Time	(0008,0030)	2	Time study began.	Time compilation of study information began
Referring Physician's Name	(0008,0090)	2	Physician making referral	
Study ID	(0020,0010)	2	Study identifier issued by user or equipment	Information is set so that modalities can identify test types.
Accession Number	(0008,0050)	2	RIS-issued number for identifying order of study.	An RIS-issued study number is set. When not obtained from RIS, Length = 0.
Study Description	(0008,1030)	3	Institution-issued description or classification of study (component element) conducted	
Referenced Study Sequence	(0008,1110)	3	Study SOP Sequence that provides correlation for the Study SOP Class/Instance pair.	
> Referenced SOP Class UID	(0008,1150)	1C	Uniquely identifies the referenced SOP Class and is required when transferring the Referenced Study Sequence.	
> Referenced SOP Instance UID	(0008,1155)	1C	Uniquely identifies the referenced SOP Instance and is required when transferring the Referenced Study Sequence.	
Physician(s) of Record	(0018,1048)	3	Physician who is responsible for patient's overall care during study.	

8.2.2.2 Patient Study Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Additional Patient History	(0010,21B0)	3	Additional information on the patient's clinical history.	

8.2.3 Series IE Module

8.2.3.1 General Series Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Modality	(0008,0060)	1	Modality	
Series Instance UID	(0020,000E)	1	Identifier unique to series	
Series Number	(0020,0011)	2	Series ID number	
Laterality	(0020,0060)	2	Whether right or left of body part is to be examined. Necessary when part to be examined is pair-structured. Enumerated values: R = Right L = Left	Length = 0
Series Date	(0008,0021)	3	Date series began	
Series Time	(0008,0031)	3	Time series began	
Series Description	(0008,103E)	3	Description provided by series user	
Body Part Examined	(0018,0015)	3	Description of test of body part to be examined. Definitions: SKULL, CSPINE, TSPINE, LSPINE, SSPINE, COCCYX, CHEST, CLAVICLE, BREAST, ABDOMEN, PELVIS, HIP, SHOULDER, ELBOW, KNEE, ANKLE, HAND, FOOT, EXTREMITY	Values shown below are used for CR. Body part definitions not existing in the DICOM definitions will be added. HEAD, NECK, CHEST, BREAST, ABDOMEN, PELVIS, UP_EXM, LOW_EXM, TEST
Referenced Study Component Sequence	(0008,1111)	3	Uniquely identifies the series -referenced Study Component SOP Instance or Modality Performed Procedure Step SOP Instance.	
> Referenced SOP Class UID	(0008,1150)	1C	Uniquely identifies the referenced SOP Class and is required when transferring the referenced Study Component Sequence.	
> Referenced SOP Instance UID	(0008,1155)	1C	Uniquely identifies the referenced SOP Instance and is required when transferring the Referenced Study Component Sequence.	
Request Attributes Sequence	(0040,0275)	3	Sequence that includes attributes derived from the Image Service Request.	

> Requested Procedure ID	(0040,1001)	1C	Identifier used for identification of Requested Procedure included in the Image Service Request. This identifier is required when there are sequence items.	
> Scheduled Procedure Step ID	(0040,0009)	1C	Identifier used for identification of Scheduled Procedure Step. This identifier is required when there are sequence items.	
> Scheduled Procedure Step Description	(0040,0007)	3	Classification of Scheduled Procedure Step described or performed at the medical institution.	
> Scheduled Action Item Code Sequence	(0040,0008)	3	Sequence used for describing the Scheduled Action Item that conforms to a specific coding scheme.	
>> Code Value	(0008,0100)	1C	Coding scheme-defined code value that indicates a Scheduled Action Item type. This is required when there are sequence items.	
>> Coding Scheme Designator	(0008,0102)	1C	Code indicating a coding scheme that maps the Code Value onto Code Mapping. This is required when there are sequence items.	
>> Coding Scheme Version	(0008,0103)	1C	This is required when there are coding scheme version sequence items and the Coding Scheme Designator value is not sufficient to identify the Code Value.	
>> Code Meaning	(0009,0104)	1C	Scheduled Procedure Step represented by the Code Value.	
Performed Procedure Step ID	(0040,0253)	3	Identifier of the Procedure performed within this step.	
Performed Procedure Step Start Date	(0040,0244)	3	Date when the Performed Procedure Step began.	
Performed Procedure Step Start Time	(0040,0245)	3	Time when the Performed Procedure Step began.	
Performed Procedure Step Description	(0040,0254)	3	Classification of Procedure Step described or performed at the medical institution.	
Performed Action Item Sequence	(0040,0260)	3	Sequence that describes Action Item performed at this Procedure Step.	
>> Code Value	(0008,0100)	1C	Coding scheme-defined code value that indicates a Performed Action Item type. This is required when there are sequence items.	

>> Coding Scheme Designator	(0008,0102)	1C	Code indicating a coding scheme that maps the Code Value onto Code Mapping. This is required when there are sequence items.	
>> Coding Scheme Version	(0008,0103)	1C	This is required when there are coding scheme version sequence items and the Coding Scheme Designator value is not sufficient to identify the Code Value.	
>> Code Meaning	(0009,0104)	1C	Performed Procedure Step represented by the Code Value.	
Protocol Name	(0018,1030)	3	User-defined description while performing a series.	

8.2.4 Equipment IE Module

8.2.4.1 General Equipment Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Manufacturer	(0008,0070)	2	Name of manufacturer of equipment that generated the digital image.	FUJI PHOTO FILM Co., Ltd.
Institution Name	(0008,0080)	3	Institution at which equipment that generated the digital image was installed.	
Station Name	(0008,1010)	3	User-defined name for identifying the equipment that generated the digital image.	Sets the host name of the equipment that generated the image (Image Reader's host name or the device name).
Institutional Department Name	(0008,1040)	3	Name of department at institution at which equipment that generated the digital image was installed.	
Manufacturer's Model Name	(0008,1090)	3	Manufacturer's model name for equipment that generated the digital image.	Model name given to the equipment by the manufacturer. Sets exposure model character strings.
Software Version(s)	(0018,1020)	3	Manufacturer's name of software version for the equipment that generated the digital image.	

8.2.5 Common Image IE Module

8.2.5.1 General Image Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Image Number	(0020,0013)	2	Number that identifies the image	The machine serial code (alphabets) that is the first byte of the FCR image no. is converted to a numerical value and set. A→ 1, Z→ 26

				ex. A001 1001 Z999 26999

Patient Orientation	(0020,0020)	2C	Direction patient faced for line or row of image. Necessary when for series in which image does not require an image module.	Because no image module is necessary, a tag is required. Set Length=0 if no value can be specified when an image is created.
Image Date	(0008,0023)	2C	Date on which image pixel data generation began. Necessary when image is part of a time-related series.	Sets the date of start of image generation.
Image Time	(0008,0033)	2C	Time at which image pixel data generation began. Necessary when image is part of a time-related series.	Sets the time of start of image generation.
Image Type	(0008,0008)	3	Image identification characteristic. For details, see DICOM PS3.3 C7.6.1.1.2.	See 8.2.5.1.1.
Acquisition Number	(0020,0012)	3	Number that identifies one continuous acquisition of data over a certain period of time that formed the image.	Issues numbers sequentially in units of IPs read at the Image Reader. The same number will be assigned to multiple images generated from one IP.
Acquisition Date	(0008,0022)	3	Date on which acquisition of data that formed the image began.	Sets date of start of IP reading.
Acquisition Time	(0008,0032)	3	Time at which acquisition of data that formed the image began.	Sets time of start of IP reading.
Derivation Description	(0008,2111)	3	Text description of image derivation method.	
Source Image Sequence	(0008,2112)	3	Sequence that identifies the set of image class/instance of the image used for deriving the image. Encoded as a sequence for the item (0008, 1150), (0008, 1155).	
>Referenced SOP Class UID	(0008,1150)	1C	Identifies the referenced SOP class uniquely. Necessary when (0008, 2112) will be transmitted.	
>Referenced SOP Instance UID	(0008,1155)	1C	Identifies the referenced SOP class uniquely. Necessary when (0008, 2112) will be transmitted.	
Lossy Image Compression	(0028.2110)	3	Clarifies whether image has been subjected to irreversible compression. Enumerated values: 00: Not subjected to irreversible compression 01: Subjected to irreversible compression	

Pixel Spacing	(0028,0030)	3	Physical distance, within the patient, between the centers of each pixel. Expressed as a numerical set: space between adjoining rows (delimiter), space between adjoining columns. Unit: mm.	
Image Comment	(0020,4000)	3	User-defined comment on the image.	

8.2.5.1.1 Image Type

The Image Type consists of the following components as defined by the DICOM Conformance Statement.

Value 1: Pixel data Characteristics

Value 2: Patient Examination Characteristics

Value 3: Modality Specific Characteristics

Value 4 and thereafter: Other Value n ("n" is a numerical value.)

Above values are interpreted as follows by the FCR system.

Because Values 1 and 2 have DICOM-conformed meanings, those values comply with definitions by the DICOM Conformance Statement.

Value 3 defines image data status whether it is a pre-normalized or normalized image or an image that has been subjected to any image processing.

Value 4 (Other Value 1) specifies the type of image processing performed on the original image. This value will not be specified if no changes have been made.

Value 5 (Other Value 2) specifies the date of change made according to Value 4 (Other Value 1). This value will not be specified if no changes have been made.

Value 6 (Other Value 3) specifies type of the special processing performed on the image. This value will not be specified if no special processing has been performed.

Value 7 (Other Value 4) specifies the date of special processing performed according to Value 6 (Other Value 3). This value will not be specified if no special processing has been performed.

Values assigned are as follows.

Value 1 (complied with the DICOM Conformance Statement.)

ORIGINAL: Image whose pixel size is based on the original image (pre-normalized or normalized image).

DERIVED: Image derived from the pixel size of one or more images, according to a certain method (processed image).

Value 2 (complied with the DICOM Conformance Statement.)

PRIMARY Image created as a direct result of patient study.

SECONDARY: Image created after the primary study.

Value 3

PRE_NORMALIZED: Pre-normalized image

NORMALIZED: Normalized image

POST_PROCESSED: Processed image

Value 4

RENORMALIZED: Image subjected to re-normalization processing.

MODIFIED_PARAM: Image whose processing parameters have been modified.

Value 5 and Value 7

Specifies the date when image processing was performed in the "YYYYMMDDhhmmss" format.

Value 6

STICHED: Image composition processing used to create one image from multiple images.

BONE: Bone image created using the energy subtraction processing.

SOFT_TISSUE: Soft tissue image created using the energy subtraction processing.

When "RENORMALIZED" is specified for Value 4 above, parameters will not be changed if they have been modified.

8.2.5.2 Image Pixel Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Samples per Pixel	(0028,0002)	1	Number of sample surfaces an image has.	Fixed at 1 for FCR images.
Photometric Interpretation	(0028,0004)	1	Specifies the intended interpretation of image data. MONOCHROME1 Indicates that pixel data has a single monochrome image surface. Minimum sample value is to be displayed in white following VOI gray scale conversion. MONOCHROME2 Indicates that pixel data has a single monochrome surface. Minimum sample value is to be displayed in black following VOI gray scale conversion. The following definitions also exist: PALETTE COLOR, RGB, HSV, ARCB, CMYK	Fixed at MONOCHROME1 for FCR.
Rows	(0028,0010)	1	Number of rows in an image	
Columns	(0028,0011)	1	Number of columns in an image	
Bits Allocated	(0028,0100)	1	Number of bits allocated to each pixel sample. Each sample has the same number of bits allocated.	
Bit Stored	(0028,0101)	1	Number of bits to be stored for each pixel sample. Each samples will have the same number of bits stored.	
High Bit	(0028,0102)	1	High bit for each pixel sample. Each sample will have the same number of high bits.	

Pixel Representation	(0028,0103)	1	Data representation for pixel sample. Each sample will have the same pixel representation.	0000H for FCR images.
Pixel Data	(7FE0, 0010)	1	Stream of pixel samples that compose the image.	
Pixel Aspect Ratio	(0028,0034)	1C	Image's pixel aspect ratio in real world, specified as a numerical set of the row value (delimiter) and column value. Necessary when the aspect ratio is not 1\1 and the image surface module is not applicable to this image.	

8.2.5.3 Contrast Medium/Bolus Module

This is necessary when a contrast medium or bolus has been used (and is not necessary when they haven't), but as there is no means for determining whether they have been used, a tag will be attached but no information set.

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Contrast / Bolus Agent	(0018,0010)	2	Contrast medium or bolus agent	Length = 0

8.2.6 Computed Radiography Image

8.2.6.1 CR Series Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Body Part Examined	(0018,0015)	2	Text description of body part examined. Definitions follow. SKULL, CSPINE, TSPINE, LSPINE, SSPINE, COCCYX, CHEST, CLAVICLE, BREAST, ABDOMEN, PELVIS, HIP,SHOULDER, ELBOW, KNEE, ANKLE, HAND, FOOT, EXTREMITY	Values shown below are used for CR. Body part definitions not existing in the DICOM definitions will be added. HEAD, NECK, CHEST, BREAST, ABDOMEN, PELVIS, UP_EXM, LOW_EXM, TEST
View Position	(0018,5101)	2	Visual field of X-ray related to patient's position (0018,5100). Definitions follow. AP = Anterior/Posterior PA = Posterior/Anterior LL = Left Lateral RL = Right Lateral RLD = Right Lateral Decubitus LLD = Left Lateral Decubitus RLD = Right Lateral Oblique LLD = Left Lateral Oblique	Length=0 if no value is determined.

8.2.6.2 CR Image Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
KVP	(0018,0060)	3	Peak KVP output of the X-ray-generator used.	
Plate ID	(0018,1004)	3	ID or serial no. of the sensing plate on which the image was collected.	Sets the IP bar code no. Format: "a********c"
Exposure Time	(0018,1150)	3	X-ray exposure time. Unit: msec.	
X-ray Tube Current	(0018,1151)	3	X-ray tube current. Unit: mA.	
Acquisition Device Processing Description	(0018,1400)	3	Processing descriptions particular to image-related equipment. (Ex.: description of internal organ.)	Sets menu name. Exposure menu name.
Acquisition Device Processing Code	(0018,1401)	3	Code indicating processing particular to image-related equipment. (Ex.: CR internal organ filter code.)	Sets menu code. Codifies the body part, exposure method and exposure menu. Taken to be FFFF if no value exists.
Sensitivity	(0018,6000)	3	Reading sensitivity	
Imager Pixel Spacing	(0018,1164)	3	Physical distance between the pixel centers, measured in front of the Image Receptor housing. For the CR, the "front" is defined as the outside surface of a CR plate closest to the patient and radiation source.	

8.2.7 Overlay

8.2.7.1 Overlay Aspect Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Overlay Rows	(60xx,0010)	1	Number of rows overlay has.	
Overlay Columns	(60xx,0011)	1	Number of columns overlay has.	
Overlay Type	(60xx,0040)	1	Indicates whether overlay shows the region of interest (ROI) or another geometric figure. Enumerated values follow. G = Geometric figure Used for reference marks, figure-like annotations, bit map text and other expressions. R = ROI Used to designate a region of special interest on an image.	

Origin	(60xx,0050)	1	Position of the first overlay point for pixels within image. Assigned using rows and columns.	
Overlay Bits Allocated	(60xx,0100)	1	Number of bits allocated for overlay. When inlaid in the image data, it is the same as the bits allocated to pixel data.	
Bit Position	(60xx,0102)	1	Bit in which overlay is stored.	
Overlay Data	(60xx,3000)	1C	Overlay data is either included within this attribute or inlaid in the group 7FE0 image pixel data. Necessary when overlay data is within this group.	
Overlay Description	(60xx,0022)	3	User-defined comment on overlay.	
Overlay Subtype	(60xx,0045)	3	Definition to classify the specified purpose of the ROI overlay type.	
Overlay Label	(60xx,1500)	3	User-defined text character string for classifying or indicating the overlay.	

8.2.8 Lookup Table

8.2.8.1 Modality LUT Module

The following values are set for CR images. Do not use FINP values here.

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
Rescale Intercept	(0028,1052)	1C	Output unit specified within storage value (SV) and rescale type (0028,1054) is m * SV + b. Necessary when modality LUT sequence (0028,3000) does not exist.	For CR image: -240
Rescale Slope	(0028,1053)	1C	This is the "m" within the formula given in terms of rescale intercept (0028,1052). Necessary when rescale intercept exists.	For CR image: 2.81525
Rescale Type	(0028,1054)	1C	Specifies the output values for rescale slope (0028.1053) and rescale intercept (0028,1052). Necessary when rescale intercept exists.	For FCR: OD

8.2.8.2 VOI LUT Module

Basically, this module will not be set up for CR images, which, however, needs be output depending on the setup. Thus, when this module is received, output it as is.

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
VOI LUT Sequence	(0028,3010)	3	Defines the VOI LUT sequence.	
> LUT Descriptor	(0028,3002)	1C	Specifies the format of the LUT data within the sequence. For details, see DICOM Standards, PS3.3 C11.1.1. Necessary when VOI LUT sequence (0028,3010) is transmitted. Format is as follows. Number registered/value of first pixel mapped/number of bits (8 or 16) allocated to LUT data	
> LUT Explanation	(0028,3003)	1C	Free-style text explanation of meaning of LUT.	
> LUT Data	(0028,3006)	1C	LUT data within this sequence. When padding is considered necessary to complete a full word, 0 shall be used. Necessary when VOI LUT sequence (0028,3010) is transmitted.	

8.2.9 General Module

8.2.9.1 SOP Common Module

Attribute Name	Tag	Type	DICOM Definition	FUJI's Extension
SOP Class UID	(0008,0016)	1	Identifies the SOP class uniquely.	
SOP Instance UID	(0008,0018)	1	Identifies the SOP instance uniquely.	
Specific Character Set	(0008,0005)	1C	Used to expand the basic figure set or when using a substitute character set. Necessary in expansion or when using a substitute character set.	Used for represent the following values. Alphanumerics: No tag European languages: ISO_IR 100 Japanese (backslash is half-size) Half-size kana only: ISO 2022 IR 13 Half-size kana + kanji: ISO 2022 IR 13 \ ISO 2022 IR 87 Kanji only (half-size kana not used): \ ISO 2022 IR 87

8.2.10 Private CR Modules

8.2.10.1 Private CR Information Modules

Shown below are the tags to be transmitted as FUJI-specific Private CR modules.

Tag		Name	VR
0009	XX04	Image Control Unit	SH
0009	XX05	Image UID	OW
0009	XX06	Route Image UID	OW
0009	XX08	Image Display Information Version No.	UL
0009	XX09	Patient Information Version No.	UL
0009	XX0C	Fil UID	OW
0009	XX10	Exposure Unit Type Code	CS
0009	XX80	Kanji Hospital Name	LO
0009	XX90	Distribution Code	ST
0009	XX92	Kanji Department Name	SH
0009	XXF0	Blackening Process Flag	CS
0019	XX15	Kanji Body Part for Exposure	LO
0019	XX30	Menu Character String	LO
0019	XX32	Kanji Menu Name	LO
0019	XX40	Image Processing Type	CS
0019	XX50	EDR Mode	CS
0019	XX60	Radiographer's Code	SH
0019	XX70	Split Exposure Format	IS
0019	XX71	No. of Split Exposure Frames	IS
0019	XX80	Reading Position Specification	IS
0019	XX81	Reading Sensitivi ty Center	IS
0019	XX90	Film Annotation Character String 1	SH
0019	XX91	Film Annotation Character String 2	SH
0021	XX10	FCR Image ID	CS
0021	XX30	Set No.	CS
0021	XX40	Image No. in the Set	IS
0021	XX50	Pair Processing Information	CS
0021	XX80	Equipment Type-Specific Information	CS
0025	XX10	Relative Light Emission Amount Sk	US
0025	XX11	Term of Correction for Each IP Type St	US
0025	XX12	Reading Gain Gp	US
0029	XX20	Image Scanning Direction	CS
0029	XX25	Image Rotation/Reversal Information	CS
0029	XX30	Extended Reading Size Value	CS
0029	XX34	Mag./Reduc. Ratio	US
0029	XX44	Line Density Code	CS
0029	XX50	Data Compression Code	CS
0032	1032	Requesting Physician	PN
0032	1033	Requesting Service	LO
2010	0010	Image Display Format	ST
2010	0030	Annotation Display Format ID	CS
2010	0040	Film Orientation	CS
2010	0050	Film Size ID	CS
2010	0100	Border Density	CS
2010	0140	Trim	CS

2011	XX11	Image Position Specifying Flag	CS
2020	0010	Image Position	US
50F1	XX06	Energy Subtraction Param.	CS
50F1	XX07	Subtraction Registration Result	CS
50F1	XX08	Energy Subtraction Param. 2	CS
50F1	XX09	Afin Conversion Coefficient	SL
50F1	XX10	Film Output Format	CS
50F1	XX20	Image Processing Modification Flag	CS

8.2.11 Private Creator

8.2.11.1 Private Creator List

Attribute Name	Tag	Type	FUJI's Extension
Private Creator	(0009,00xx)	1C	Necessary if the "FDMS 1.0" 0009 group is available.
Private Creator	(0019,00xx)	1C	Necessary if the "FDMS 1.0" 0019 group is available.
Private Creator	(0021,00xx)	1C	Necessary if the "FDMS 1.0" 0021 group is available.
Private Creator	(0023, 00xx)	1C	Necessary if the "FDMS 1.0" 0023 group is available.
Private Creator	(0025,00xx)	1C	Necessary if the "FDMS 1.0" 0025 group is available.
Private Creator	(0027, 00xx)	1C	Necessary if the "FDMS 1.0" 0027 group is available.
Private Creator	(0029, 00xx)	1C	Necessary if the "FDMS 1.0" 0029 group is available.
Private Creator	(2011,00xx)	1C	Necessary if the "FDMS 1.0" 2011 group is available.
Private Creator	(50F1,00xx)	1C	Necessary if the "FDMS 1.0" 50F1 group is available.

FUJIFILM

DICOM Conformance Statement
FUJI Computed Radiography
QA-WS771
(PRINT SERVICE)

June 2001
3rd Edition

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004-312-30 2001.06

Revision History

History	Date	Revision
Revision 1.0	1999.03.12	First Edition
Revision 1.1	1999.04.13	Errors corrected
Revision 2.0	2000.07.10	A03 version software support and detailed descriptions of the content
Revision 2.1	2001.03.12	A05 version software support

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1. Overview

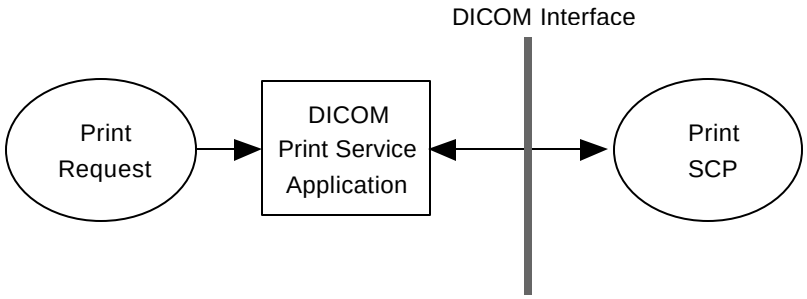
This conformance statement was written in accordance with PS3.2 of DICOM V3.0.
The applications described in this conformance statement are for the implementation of FUJI Computed Radiography QA-WS ("QA-WS" hereinafter), which implements conversion between DICOM networks and FUJI Computed Radiography. The QA-WS functions as a service class user (SCU) for the Print Management Service Class.

2. Model Implementation

The QA-WS implements application entity that supports DICOM Print Management Service Class for establishing applications with remote application entities.

2.1 Application Data Flow

The DICOM Print Service Application Entity is a Windows application for providing communication between FUJI products and DICOM network devices.
The DICOM Print Service Application Entity is started up by a local print request process.
Application data flow is shown below.



The DICOM Print Service Application Entity establishes on the remote DICOM AE associations for the DICOM print service class. For each print information transmission queue registered internally, a new association is started up for the remote DICOM AE. One or several pieces of print information may be transmitted for an association that is established. Print information that has accumulated on the transmission queue is converted from the internal management data format to the remote DICOM format and transmitted to the remote DICOM AE via established associations.

2.2 AE Function Definition

The DICOM Print Service Application Entity transmits printer information acquisition request, print information and print images to the DICOM Print Management Service Class Provider requesting those images to be printed. The applications support the following functions.

- Monitoring the requests of the local printing request process and starting up when these requests have been received.
- Converting internal management data format objects to DICOM Print information objects.
- Controlling associations between remote DICOM Application Entity and DICOM Print Service Application Entity.

- Transmitting the request of the printer information acquisition.
- Transmitting DICOM Print information, such as DICOM film session, film box and image box.

2.3 Sequences for Real World Activities

Do not apply.

3. Application Specifications

As the SCU, the QA-WS DICOM Service Application Entity provides the following DICOM SOP classes with the standard conformance.

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9

3.1 Policy for Establishing Associations

3.1.1 Overview

- Attempting to establish new associations only on the SCU's side in every print session.
- Releasing associations only on SCU's side. (normal termination)
- Associations can be aborted by both the SCU and the SCP.
- The number for the application context name consists of as follows.

Application Context Name	1.2.840.10008.3.1.1.1

- Maximum PDU size is included at time of association negotiation.

The maximum PDU size for the QA-WS is as follows.

Maximum Length Protocol Data Unit	128KByte

- The remote DICOM AE title, port no. and IP address are known (they are the values set to the configuration file).

3.1.2 Number of Associations

Attempts a maximum of four associations at the same time against the remote DICOM AE. The maximum number of associations can be modified in accordance with the internal settings.

3.1.3 Asynchronous Operations

Not supported.

3.1.4 Implementation Identification Information

The QA-WS DICOM service provides the following implementation class UID.

QA-WS Implementation Class UID	1.2.392.200036.9125.5457.1.1.5.1

The following number is provided for the implementation version name.

QA-WS Implementation Version Name	QAWS77101A05

3.2 Association Startup Policy

To conduct print processing, the QA-WS application attempts to start up new associations on the remote DICOM AE.

3.2.1 Related Real World Activities

A related real world activity is to attempt transmissions of objects having implicit VR encoding. The QA-WS application cannot transmit objects with any other transmission syntax. For transmission purposes, the QA-WS application provides thus a single transmission syntax only.

3.2.2 Proposed Presentation Context

The following transmission syntax can be accepted.
Table-1

Name	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2

The QA-WS application proposes any of the presentation contexts indicated below.

Presentation Context Table				
Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Table-1	SCU	None

3.2.3 SOP Characteristics Compatibility

None

3.3 Association Accepting Policy

The QA-WS is a Service Class User and supports only startup of associations, not accepting associations from other AEs.

4. Communication Specifications

4.1 Communication Stacks Supported

This system provides DICOM V3.0 TCP/IP network support.

4.2 TCP/IP Stacks

This system utilizes the TCP/IP stacks provided by the Windows system.

4.3 Physical Media Supported

IEEE 802.3 (10BASE-T) / IEEE 802.3U (1000BASE-TX)

5. Expansion Specifications

SCP Class: Basic Grayscale Image Box

■ Attribute: Bits Stored (0028, 0101)
Supports value 10. According to the DICOM-conforming range, only 8 or 12 is supported. Whether to use value 10 or not can be specified in accordance with what the SCP side supports.

■ Attribute: High Bit (0028, 0102)
Supports value 9. According to the DICOM -conforming range, only 7 is 11 is supported. Whether to use value 9 or not can be specified in accordance with what the SCP side supports.

6. Configuration Information

As settings for the Basic Grayscale Print Management Meta SOP Class SCP, the following information can be set for each SCP. A maximum of 127 remote AEs can be registered.

- IP address
- Host name
- AE name
- Port no.
- Default attribute information

7. Support Class Details

7.1 Basic Film Session SOP Class (1.2.840.10008.5.1.1.1)

Supports the following DIMSE service.

- N-CREATE

7.1.1 N-CREATE

■ Overview

- Creates attribute information necessary for the Basic Film Session SOP, based on the attribute information of internally saved image data and the internally set information.
- Handles only one Basic Film Session SOP with just one association.

■ Attribute information

Tag	Name	Usage	Supported	Remark
2000,0010	Number of Copies	U/M	1-99	Transfers the number of copies specified on the upper-order device (image reader). Changes via the application user i/f are not possible.
2000,0020	Print Priority	U/M	LOW	
2000,0030	Medium Type	U/M	BLUE FILM CLEAR FILM PAPER	Transfers values specified using the configuration file. With the configuration file, it is possible to specify one fixed value for each destination AE.
2000,0040	Film Destination	U/M	PROCESSOR MAGAZINE BIN_i (i: value)	Transfers values specified using the configuration file. With the configuration file, it is possible to specify one fixed value for each destination AE.

■ Action for status

When the Warning status was sent back, it will be handled as an error internally, suspending thus processing thereafter.

7.2 Basic Film Box SOP Class (1.2.840.10008.5.1.1.2)

Supports the following DIMSE service.

- N-CREATE
- N-ACTION

7.2.1 N-CREATE

■ Overview

- Creates attribute information necessary for the Basic Film Box SOP, based on the attribute information of internally saved image data and the internally set information.

■ Attribute information

Tag	Name	Usage	Supported	Remark
2010,0010	Image Display Format	M/M	STANDARD\1,1 STANDARD\2,1 STANDARD\1,2 STANDARD\1,2	Transfers values specified on the upper-order device (image reader). Changes via the application user i/f are possible.
2010,0040	Film Orientation	U/M	PORTRAIT LANDSCAPE	Using the QA-WS application, automatically creates values based on the Image Display Format, Film Size ID, image rotation/reversal specifying information and image size.
2010,0050	Film Size ID	U/M	8INX10IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM	Transfers values specified using the configuration file. With the configuration file, it is possible to specify one fixed value for each destination AE. However, only 11INx14IN and 14INx17IN can alternately be changed automatically from Image Display Format or image size.
2010,0060	Magnification Type	U/M	REPLICATE BILINEAR CUBIC NONE	Transfers values specified using the configuration file. With the configuration file, it is possible to specify one fixed value for each destination AE.
2010,0080	Smoothing Type	U/U		Transfers values specified using the configuration file. With the configuration file, it is possible to specify one fixed character string for each destination AE. No values will be transferred if the fixed character string is not specified.
2010,0100	Border Density	U/U	BLACK WHITE	Transfers values specified on the upper-order device (image reader). If no values are specified from the upper-order device, values specified using the configuration file will be transferred. With the configuration file, it is possible to specify one fixed value for each destination AE.
2010,0140	Trim	U/U	NO (Fixed)	“Trim” draws images with the QA-WS application. Because “Trim” transfers drawn image data, images are output with “Trim” fixed to “NO”.

2010,0500	Referenced Film Session Sequence	M/M		
0008,1150	> Referenced SOP Class UID	M/M	1.2.840.10008.5.1.1.1	Film Session SOP Class UID
0008,1155	> Referenced SOP Instance UID	M/M		Specifies values sent back according to N-Create-Rsp of the Film Session SOP Class.
2010,0510	Referenced Image Box Sequence	-/M		Transfers no values when N-Create-Rsp is sent. Values sent back according to N-Create-Rsp will be used for N-Create-Rq of Image Box that occurs thereafter.
0008,1150	> Referenced SOP Class UID	-/M		
0008,1155	> Referenced SOP Instance UID	-/M		

■ Action for status

When the Warning status was sent back, it will be handled as an error internally, suspending thus processing thereafter.

7.2.2 N-ACTION

■ Overview

- Requests the SCP to print images, based on all information hierarchies with root on the specified Basic Film Box SOP Instance.

■ Attribute information

No attributes are available.

■ Action for status

When the Warning status was sent back, it will be handled as an error internally, suspending thus processing thereafter.

7.3 Basic Grayscale Image Box (1.2.840.10008.5.1.1.4)

Supports the following DIMSE service.

- N-SET

7.3.1 N-SET

■ Overview

- Creates attribute information necessary for the Basic Image Box SOP, based on the attribute information of internally saved image data and the internally set information.

■ Attribute information

Tag	Name	Usage	Supported	Remark
2020,0010	Image Position	M/M	1-4	Transfers values specified on the upper-order device (image reader). Changes via the application user i/f are possible.
2020,0030	Requested Image Size	U/U		When "transfer using the configuration file" has been specified if it is possible to specify whether or not to transfer using the configuration file, transfers values specified in the configuration file for each of Image Display Format, Film Orientation, and image size and image rotation/reversal.
2020,0110	Performed Grayscale Image Sequence	M/M		
0028,0002	> Sample Per Pixel	M/M	1	
0028,0004	> Photometric Interpretation	M/M	MNOCHROME1	
0028,0010	> Rows	M/M		
0028,0011	> Columns	M/M		
0028,0034	> Pixel Aspect Ratio	MC/M	1\1	
0028,0100	> Bits Allocated	M/M	16	
0028,0101	> Bits Stored	M/M	12 or 10	12 or 10 can be changed alternately using the configuration file.
0028,0102	> High Bits	M/M	11 or 9	Specify 11 when Bits Stored are 12 and 9 when they are 10.
0028,0103	> Pixel Representation	M/M	0	
7FE0,0010	> Pixel Data	M/M		

■ Action for status

When the Warning status was sent back, it will be handled as an error internally, suspending thus processing thereafter.

7.4 Printer SOP Class (1.2.840.10008.5.1.1.16)

Supports the following DIMSE service.

- N-EVENT-REPORT
- N-GET

7.4.1 N-EVNET-REPORT

■ Overview

- When the Printer status was changed, receives the status thus changed from the Printer SOP Class Provider.
- The status information received will not be used and disregarded. (If the Printer status is needed, it can be obtained by using N-GET.)

- Irrespective of Printer status, the Print processing will be continued.

■ Event type and attribute information

Internal information will not be viewed.

7.4.2 N-GET

■ Overview

- Obtains Printer status from the Printer SOP Class Provider.

■ Attribute information

No settings will be made on the Data Set Unit and all information that can be set will be obtained on the Printer side.

■ Action for status

Any status that is not "SUCCESS" will be recognized as error.